

extended resides on one volume 318. All the available disk space (2 Gigabytes) from the configured VM disk 322 is then added to the logical volume 318, thereby increasing the size of the file system 324 and its underlying volume 326.

5 *Dynamically Enabling SAN Manager*

Upon installation of software defining the agents 24 and manager 20, scanners in the agents operate as described above, e.g., to identify devices connected to their respective hosts. That information is transmitted to the SAN manager 20 and, specifically, to the discover engine 40 (and, therefrom, to the manager service 38) for generation of a topological representation of the SAN. This is presented via the graphical user interface, e.g., NetView console, to the operator/administrator for purposes of making LUN assignments and otherwise administering the SAN.

15 If operated in the manner described above, the filter drivers 354 would prevent the hosts 12 from accessing any fiber channel storage devices 14 at the time of installation of the agent software – because, at that point, LUN assignments have not yet been made. This can be problematic when, for example, the installation is made over preexisting systems, insofar as users of the hosts 12 would be prevented from accessing the devices until installation is complete and assignments are
20 made. To minimize such potential for interruption to users and hosts, the illustrated embodiment utilizes the mechanisms below to permit host scanning, topology generation, and LUN assignment (among other SAN functions) upon installation, without preventing the hosts from

accessing storage devices – at least until such time as the operator/administrator formally “deploys” the system.

Referring to FIGURE 41, three flags that reside in a central store are utilized to determine whether the filter driver 354 is active or not, and whether preliminary LUN assignment is enabled. These flags, which can be bits, bytes, fields, records, or other indicators, are referred to here as “assign enable,” “fully enable,” and “disable.” The assign enable flag, when activated by the administrator, allows host/LUN assignments to be made (these have a pending status until deployed). The fully enable flag, if set by the administrator, activates the filter drivers 354. The disable flag, if set by the administrator, disables the filter drivers 354. In the illustrated embodiment, the flags are stored in a configuration file 500 on the manager digital data processor 20, though in other embodiments the flags reside anywhere in the SAN (e.g., together, independently or otherwise) accessible to the hosts 12 and manager 20.

When the SAN software is first installed, the disable flag is set, thereby permitting the agents and scanners to act in the normal course, but prohibiting the filter driver 354 from intercepting and blocking storage device claims for unassigned LUNs (or from otherwise blocking access to such LUNs). Hence, until deployment, the hosts 12 can access all storage devices to which they are coupled via the interconnect 16.

In order to configure the SAN, the operator/administrator sets the assign enable flag in the configuration file 500 by selecting the enable button 116a (or other user input field or option) on the graphical user interface (GUI) shown in FIGURE 19. This has the effect of allowing

preliminary host/LUN assignments to be made. Because the disable flag is still set at this point, the hosts 12 can continue to access devices 14 while the administrator is making pending assignments.

5 Once finished making preliminary host/LUN assignments, the operator/administrator initiates activation of the filter driver 354, by selecting the deploy button 116b (or other user input field or option) on the GUI, which has the effect of setting the fully enable flag. In some embodiments, the filter drivers 354 are installed on their respective hosts 12 at the time the agent software is installed. In these embodiments, the filter drivers 354 are activated when the fully enable flag is
10 set. In the illustrated embodiment, selection of the deploy button 116b has the additional effect of causing the manager 20 to download the filter drivers 354 to the respective agents the first instance. In either embodiment, selecting the deploy button 116b can cause the hosts to reboot, e.g. after downloading of the filter driver 354 and/or setting of the fully-enable flag, so that the storage device claiming process can proceed as described earlier.

15 The operator/administrator can subsequently disable the filter drivers 354 and, thereby, permit the hosts 12 to access all devices 14, by selecting the disable button 116c on the GUI (shown in FIGURE 19). This action causes the disable flag in the configuration file 500 to be set, and the filter drivers 354 to be disabled.

20 The foregoing defines a two-step process. The first step is to enable assignments, and the second step is to deploy the agents (filter drivers). If the operator/administrator is not concerned about a period of no access, he/she can invoke the second step immediately after the first step. However,